

# NASA TECH BRIEF

## Langley Research Center



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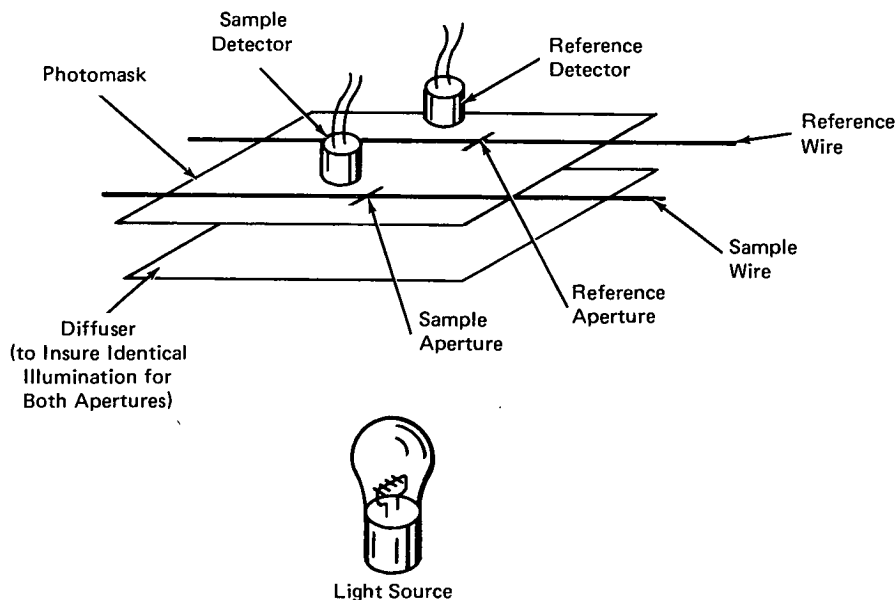
### Electro-Optical Device for Monitoring Wire Size

A device to monitor and recognize variations in wire size has been developed and is being used during computer memory-plane fabrication. The electro-optical device is simple in operation but provides an accurate means of wire-size monitoring.

Computer memory-plane fabrication relies on a decrease in wire diameter, due to stretching, to permit removal of the wire from the memory-plane mold. Wire breakage, prior to removal from the mold, is caused by localized variations in wire size and results in a useless mold. Wire-size monitoring by this system provides a means of detecting imperfect wire and permits fabrication of the computer memory plane to be stopped prior to its insertion into the mold. The imperfect wire can be removed and the fabrication process continued without damage to the memory plane.

The components of this device are shown in the illustration. The photomask has two apertures, reference and sample. The reference aperture has a reference wire mounted across it and the wire to be monitored is passed continuously across the sample aperture in the same geometrical configuration as the reference wire. Diffuse light illuminates the identical apertures which are mounted over photodiode-preamplifiers.

The reference photodiode-preamplifier voltage output is proportional to the unobscured area of the reference aperture. The photodiode-preamplifier outputs are applied to the inputs of a differential operational amplifier where they are subtracted and the difference amplified. Monitored wire which is the same size as the reference wire will result in zero output voltage. Smaller monitored wire will result in a negative voltage indication and larger wire will result in a positive voltage indication.



Wire-Size Monitoring Device

(continued overleaf)

System sensitivity is determined by amplifier gain, the ratio of the difference in cross-sectional area between the reference wire and the wire being monitored, and the unobscured area of the reference aperture.

**Note:**

Requests for further information may be directed to:

Technology Utilization Officer  
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Reference: B73-10321

**Patent status:**

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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